Improved Storm Water Monitoring Technology

Wireless Network Links Remote Sites to Master Receiving Station

The Naval Facilities Engineering Service Center (NFESC) in partnership with the Space and Warfare Command (SPAWAR), San Diego developed and demonstrated a remotely operated and automated enhanced storm water monitoring system at Naval Station (NAVSTA) San Diego. This monitoring technology is based on a wireless network that links each remote site to a master receiving station using packet radio technology. Each remote site contains a sampler, remote terminal unit (RTU), a transceiver (packet radio) and a solar panel to provide reliable/renewable electrical power for the system. Commands/control can be issued via a master station to each remote site. This wireless network allows for complete communication between a central station and the remote sites. Users logging on to the Central Control Station can assess the status and readiness of the samplers as well as remotely operate them. Data collected by the samplers (including flow, turbidity and conductivity) are transmitted in real time to the central station for logging and if necessary, activating the sampling process. Currently, three sites are fully operational with transceivers, samplers and repeaters.

Storm water monitoring is an important element not only for permit compliance but also for designing and implementing an effective storm water

Remote site pier configuration at Naval Station San Diego.

Remote site at the Graving Dock Naval Station San Diego.

program at Department of Defense (DoD) activities. Previous studies noted that the highest concentrations of contaminants are found in the "first flush" discharges, which occur during the first major storm event after an extended dry period. The ability to reliably collect the "first flush" samples is essential to assess the effectiveness of the storm water program.

Improvement to the prevalent and current automated data collection technique was made by programming the embedded controller within the sampler to reflect the correct sequence of events such as: time and amount of rainfall, time and duration of pump operation, time and duration of flow sensor activation. This capability is needed to identify the correct sampling time relative to the rain event as well as assisting facilities to monitor illicit discharges from industrial operations. The electrical power system was also redesigned and tested to include solar panels providing increased reliability and readiness of the sampler to handle storm events.

Although the primary benefit of this technology is to improve the performance of conventional samplers, expected cost savings are realized by reducing time and resources required for maintenance and inspection. Other expected benefits include:

- Enabling DoD activities to comply with storm water regulations,
- Allowing users to remotely monitor and control the status and operation of each sampler without the need to visit a large number of sites,
- Improving readiness and reliability of automated samplers by identifying problems in real-time and thus allow timely maintenance and repair,
- Avoiding unsafe working conditions during storms, and
- Reducing resources needed for maintenance and increased data quality. ⚓

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